



CRITICAL CURRICULUM INQUIRY IN AN UNDERGRADUATE VISUAL COMMUNICATION DESIGN PROGRAMME

A CASE STUDY APPROACH THROUGH A
COMPLEXITY THEORY LENS

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INTRODUCTION

The challenge to curricula to encourage socially sustainable ways of living – environmentally, economically and socially – is a global phenomenon. An example is the Millennium Development Goals of the United Nations that aim to create a global partnership for development to address poverty, illness, health, education and environmental sustainability (United Nations 2011). The Earth Charter Initiative (n.d.) aims of addressing principles for constructing a just, sustainable and peaceful global society are similar. In South Africa, the Department of Education, in the Education White Paper of 1997 (RSA DoE 1997), as well as in the Report of the Ministerial Committee on Transformation and Social Cohesion and the Elimination of Discrimination in Public Higher Education Institutions (RSA DoE 2008), aims at addressing the importance of social change and integration. The Stellenbosch University HOPE Project (Stellenbosch University 2010), an initiative of the rector of this university, comprises concrete ways of addressing critical social issues on campus, and also in the broader South African society.

I have introduced a module named Citizenship into the Visual Communication Design (VCD) curriculum at the Visual Arts Department for first- to third-year students as a reaction to global and local calls for social transformation and because of a personal realisation of the importance of transformation. Before the introduction of the Citizenship component, social transformation issues were often mentioned, but they were implicit and never directly addressed in the VCD curriculum. The Citizenship module comprises different components: conversations, community interaction, reflection and the use of art as a medium to express and work through sensitive issues. Themes such as stereotyping, power relations, blackness/whiteness, and social deprivation have been explored among students and Grade 11 learners of Kayamandi

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High School in Stellenbosch. All community interaction in the VCD curriculum take place in partnership with the NGOs Vision-K (Kayamandi) and Vision-V (Vlottenburg), which facilitate a life skills programme for Grade 10-12 learners.

Nussbaum's (2002) description of good citizenship, which includes the ability to criticise your own traditions, mutual respect for other opinions, thinking as a citizen of the world and not only locally, and imagining yourself in the shoes of others – what she calls the “narrative imagination” – was used as a framework for the Citizenship module. Students and learners wrote reflections on their experience after each interaction, as well as an overall reflection at the end of the three-week module. These reflections, together with 12 focus group interviews and observations collected from 22 learners and 65 students, were the main sources of data for the case study to investigate the value of the module.

Complexity evolves as a result of the presence of a large number of elements, and because of the relationships between all these elements. In a curriculum case study such as this, information is selected and reduced to make the data manageable and understandable, but in the process some information may be missed and the relationship among the elements that impact on the curriculum could be overlooked. In his book *Complexity and postmodernism: understanding complex systems* (2000), Cilliers describes the process of selection and reduction as actually destroying what we seek to understand.

In this chapter it is argued that critical inquiry is needed especially in the context of a curriculum for social transformation. While a case study can provide an indication of value, a more holistic inquiry incorporating a complexity theory lens could provide a richer indication of the varied nuances to the value of a module in the curriculum. In the first part of this chapter I discuss the processes followed in analysing the particular case. In the second part I use 10 criteria (Cilliers 2000) to describe the characteristics of the complex systems theory employed in re-examining the data collected in the Citizenship module. The effect of using complexity theory in combination with the case study methodology and its implications for the Visual Communication Design curriculum are indicated in my concluding remarks.

THE CASE STUDY METHODOLOGY: A DESCRIPTION OF THE PROCESS

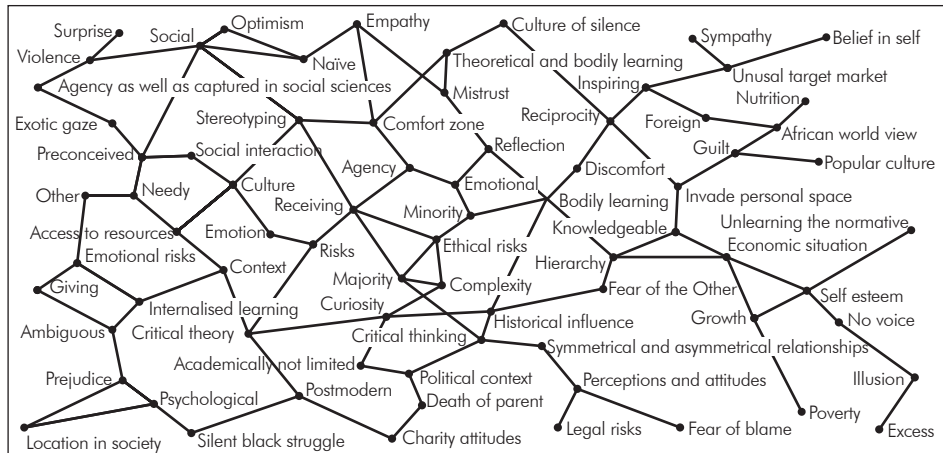
The aim of using case study research in this particular instance was to investigate students' and learners' attitudes, perceptions and expectations with regard to the Citizenship module. The components of the research, the researcher (myself), the sampling, the data and the context, when analysed in detail, contributed to the vast number of factors yielded by the research. As an example of the complexity involved, I offer the following (sometimes conflicting) elements: who was the researcher? (white and Afrikaans-speaking); who constituted the sampling? (98% white Afrikaans and 82% female students); how were the data received? (99% of reflections were written in English); and what was the context? (a historically white Afrikaans university).

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In the investigation, the context was taken into account by looking at the political, social, cultural and psychological systems in which the case study took place. Denscombe (2007:37) identifies different possible locations, namely physical, historical, social and institutional. These were taken as a guideline for analysing the context in this case study. The case was situated in two physical locations reflecting extreme opposites of the South African socio-economic reality: an affluent area (the campus of Stellenbosch University) and an economically deprived area (Kayamandi Township, a suburb of Stellenbosch). The two locations are separated physically and geographically, but they are also socially and culturally estranged from each other. Students growing up in Kayamandi Township, three kilometres from central Stellenbosch, could feel socially and culturally excluded when studying at Stellenbosch University.

Apple (2010:661) encourages serious examining of one's own "structural location" to come to grips with complex tensions in the personal and political spheres. The action-oriented case study approach (Pihlanto 1994) used in this study encouraged the realisation of the researcher's subjectivist perspective (in opposition to a more objectivist viewpoint) to understand the nature of the behaviour of people in real-world situations and to comprehend how social reality is produced. A study by Milner (2007:388) encourages researchers "into a process of racial and cultural awareness, consciousness and positionality" when conducting cross-cultural research. As a curriculum researcher, I constantly had to remind myself that bias is very possible, especially in cross-cultural research, and I had to be aware of the complexities as well as the dangers of my own prejudices and personal convictions. A focus of Milner's (2007:397) work is not the outcome of the research only, but also knowledge of the way in which the research is conducted, and who the persons are who conduct the research, their knowledge of critical racial perspectives and their own views, perceptions and biases.

An interpretive approach enabled an improved understanding of the context and qualities of the collected data. Socially constructed perspectives (Klein & Meyers 1999) proved to be valuable in sensitising me to possible contradictions, interpretations, distortions and biases of the narratives generated. A vast variety of factors emerged, as illustrated in Figure 16.1. It became clear that the factors did not stand on their own, but that some were related to others. A new meaning emerged when different factors were placed together. The relationship between the factors also became important. I chose the main themes and subthemes through a process of organising, categorising and reducing (illustrated in Figure 16.2). Inductive analysis proved to be valuable in processing and organising data into emerging themes, rather than applying a chosen theoretical framework to the data. I worked through the data twice and then started the process of identifying various factors, subthemes (or subunits) and themes (or units). A case study provides a fixed window into the situation during a certain time, but it continues to expand or change after that brief glimpse. To give an actual observation in context is not possible, and a case study as curriculum research should thus be understood as a partial view of reality.

PART THREE • METHODS FOR INTERROGATING, REVISIONING AND IMPLEMENTING CURRICULUM CHANGE**FIGURE 16.1** Factors identified in the data and the possible relationships between factors

Perceptions and attitudes	Theoretical and bodily learning	Symmetrical and asymmetrical relationships	Risks
Curiosity Fear of the Other Fear of blame Charity attitudes	Critical thinking Critical theory Historical influence Internalised learning Unlearning the normative	Hierarchy Giving and receiving Knowledgeable and needy	Ethical Legal Emotional

FIGURE 16.2 Data reduced to themes and subthemes**Complexity theory: A theoretical lens**

Complexity theory was used as a lens to re-evaluate the data that emerged from the Citizenship module to improve the Visual Communication Design curriculum. The nature of complexity theory, in consisting of numerous factors that constantly influence one another to make up a complex system, makes it impossible to use it as a methodology. Complexity as a theory cannot “model the totality of things” (Cilliers 2010). Case study methodology is the only possibility within our limitations of doing research, as it is known currently, but using complexity theory as a lens should lead to a difference in perspective when conducting and writing up research, because of starting off by fully comprehending that it is not a real picture of reality that is constructed.

Complexity theory has links to other theories, such as systems theory, ecology theory and cybernetics (collectively called eco-systemic theory). Chaos theory is also mentioned in this regard, but is mostly used as a mathematical sub-discipline that studies complex systems. Eco-systemic and systems theory emphasise epistemological principles, a way of thinking or knowing to make sense of the world around us (Meyer, Moore & Viljoen 2008:467). This theory is moving away from Newtonian reductionism, objectivism or rational thinking and towards an emphasis on holistic units. This approach relates to

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constructivism, in which “‘reality’ is created by the observer and there can thus be no question of one correct, objective reality” (Meyer *et al* 2008:469). Social constructivism also holds that attitudes, perceptions and expectations are socially constructed and formed in a socio-cultural context.

A human being is seen as a subsystem within a hierarchy of larger systems (such as political, social and cultural) but the individual is also made up of internal subsystems such as psychological, verbal/nonverbal, body, cognitive and spiritual (Hancock 1985, cited in Meyer *et al* 2008). Meaning is created autonomously in the interactions of the larger external systems and internal subsystems. The internal and external are interlinked and a perspective that, for instance, looks only at the psychological subsystem without also looking at the political could miss the relation between the diverse elements of a system or subsystem.

Ten characteristics of complexity theory

For the purpose of this inquiry I specifically used complexity theory as a lens, even though it is closely related to the eco-systemic theory described above. Cilliers (2000:119-123) explains complex systems in terms of 10 characteristics. I will discuss the 10 points briefly and give examples of how they relate to data analysis in curriculum research, with some references to the Citizenship module.

The first characteristic is that complex systems consist of a large number of elements. A curriculum is a complex system consisting of many elements and, because of the number of factors that play a role, will remain a complex system even though it is constantly reduced to make it manageable and researchable. The curriculum is complex because it is not only what is written on paper, but also involves where and how it plays out on the ground. Barnett (2008) refers to a hidden curriculum or a curriculum within a curriculum when he points out that what is said on paper and in policies does not always correspond with what is happening during the actual interaction in a classroom. Perceptions and expectations therefore influence the writing, implementation and research of a curriculum in subtle and complex ways.

Researching the Citizenship module is complex because of the number of factors involved. According to analytic methodology, information is selected and reduced to make it manageable and understandable, but the holistic view of all the elements together becomes lost in the process. By selecting some elements or ‘cutting it up’ we “destroy what we seek to understand” (Cilliers 2000:2). Figure 16.1, also a reduction of the complexity, includes more factors and may be a more holistic picture of reality than the reduced version in Figure 16.2. As Cilliers (2005:609) points out, “[r]eduction of complexity always leads to distortion”.

The second characteristic is that while complexity evolves because of a huge number of elements, it is also a result of the relationships between the elements (or different systems). Cilliers emphasises that a single element in a system (or a single person

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in a society) has little significance in the system: “[t]he individual is constituted by its relationship to others” (2000:119,120). Counting the sampling in a study is not complex, but establishing the political, social, cultural and psychological relationships that exist among students and learners is complex. An example to illustrate a relationship between political, social, cultural and psychological systems in the data is that of a student feeling empowered because of political changes and democratic rights in the post-apartheid society, but having almost no agency in an environment where she or he feels socially, economically or culturally excluded. The dichotomous relationship between feeling agency on the one hand and having very little on the other could cause confusion. A person who is poor not only lacks economic capital, but is usually also very conscious (psychologically) of being without material capital. To be economically impaired could possibly be linked to low levels of self-esteem. The postmodern world consists of these contradictions, and ignoring the interactions between these elements and their causes and results leads to the researcher missing some information.

The third characteristic of a complex system is that the interaction between elements is rich and becomes ever richer in the postmodern world. Cilliers (2000:3) emphasises that “any element in the system influences, and is influenced by, quite a few other ones”. A complex system does not depend on rich interactions between all elements all of the time. An example of this from the research is that, even though the Citizenship project is aimed at changing attitudes, perceptions and expectations through *repeated* community interactions and discussions, it does not mean that multiple exposures would have a greater effect on students than a single exposure. The effects of our actions are mostly unpredictable (Cilliers 2000:123). Researching the unpredictable, one would argue, is impossible, but, as Barnett argues, reality is a super-complex world that is characterised by certain features such as “contestability, challengeability, uncertainty and unpredictability” and we live in an “age in which nothing can be taken for granted”; it is an “age of conceptual and, thereby, emotional insecurity” (2000:415-416).

The fourth characteristic is that the interactions themselves could have certain characteristics. A linear interaction is transparent and not complex. Cilliers relates non-linearity to asymmetry and states that the same “information has different effects on different individuals, and small causes can have large effects”. A complex system by nature is unequal in power relations; Cilliers emphasises that this specific characteristic is the engine for keeping complexity functioning (2000:120).

The relationship between the researcher, students and learners (the sampling) is not symmetrical. The power of the lecturer over students is skewed to such an extent that students could write in their reflections what they think the lecturer wants to hear. This means that the data possibly cannot be trusted and should be taken as constructed and ambiguous. The important aspect that Cilliers (2000) highlights is that power hierarchies should be acknowledged and analysed in research to understand the

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dangers of abusing power relations. Because of skewed hierarchies and abused power relations, Deleuze and Guattari (1988) have suggested rhizomatic structures in which factors become 'points on a map' and could operate in a non-hierarchical manner. For instance, researching a multicultural group of students through the Internet and not knowing the persons being researched could reduce established hierarchies and unequal power relations and contribute to more objective analysis of data.

The fifth characteristic is that the interactions have a rather short range. Cilliers (2000:121) explains this by saying that "[e]lements operate on information that is available to them locally". Lyotard (1997:66) describes this process as local determination. Global information is processed in a local context and interpreted and reformulated from a potentially limited local experience. Differences in social memory is one example of how an actual event, for instance during apartheid, has gone through a social system that created many versions of the same event. The same information could be relayed through a different medium in an altered and deconstructed way. The way in which information is perceived also depends on the mental state of the person who interprets the information; we cannot separate knowledge processing from personal life histories. Cilliers points out that, even though the distance is short (reacting to information that is available locally) it could have far-reaching effects (2000:121).

Loops in the interaction constitute the sixth characteristic that Cilliers (2000:121) describes, meaning that "the activity of one element can directly and indirectly influence itself". Information is constantly transformed, not only by other elements in the system (or other people) but transformed in itself (oneself) as well. Cilliers (2000) stresses that, because of this characteristic, it is not impossible to interpret information; information is dependent on and conditional to a certain context and time frame. The citizenship module was designed to be flexible, reacted on because of feedback from students and learners, and changed because of the feedback. My own personal growth in understanding what social transformation involves also influenced the later content of the module. The module became a place of growth through continuous experimentation.

The seventh characteristic is that complex systems are open systems and interact freely with each other. It is difficult to determine the borders of study – the context of political, social or cultural systems is constantly in motion. I, as the researcher, determine the extent of a context; I select certain aspects of political, social and cultural systems and I leave out others. This process is called framing (Cilliers 2000:4). Cilliers (2005:611) also argues for not seeing a border as confining but rather as "constituting that which is bounded", and acknowledging that boundaries cannot be identified completely but need to be revised continually. The problem with rational research methodologies is that they struggle to represent reality and therefore more and more aspects, such as taking into consideration the context and who is doing the research, are brought into, for instance, a case study methodology. When one keeps adding to a methodology it becomes more complex and in the end is not functional. Cilliers recommends (2010)

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rather keeping to a simple methodology but realising and acknowledging that it does not represent reality.

“Complex systems operate under conditions far from equilibrium” is the eighth characteristic (Cilliers 2000:122). Complex systems need a constant flow of energy, where the process, and not the origin or goals of the system, is important. Complexity is added in the postmodern world by the overload of information we receive through the mass media. The huge amount of information available when describing the context of a specific case study, for instance, is overwhelming because it is difficult to contain within borders (as discussed earlier) but also because it is in constant motion. The processes involved in researching curricula could be very complex because they are continuously in flux, but this is usually not reflected in the outcome because it is described in simple and reduced terms.

The ninth characteristic is that complex systems have a history that affects the current functions of those systems. The data in the case study were collected within a period of one year. The aim in a case study is also to take into consideration the broader context; what happened before that year and how that history influenced the current data. I myself therefore ‘constructed’ the ‘history’ part, that which happened before the time when the data were collected. I am a product of a system where the Western, Afrikaans canon was exclusively promoted, a system that left out the black African majority. The geographic context of where one grew up was ignored, and colonisers kept their own exclusive knowledge systems in place without allowing the context to influence knowledge production. Even though we live in Africa, African Art was completely ignored in the Art History course at Pretoria University when I studied there from 1982 to 1985. Case study methodology may promote seeing things in context, but a history that ignores huge parts of the context makes it very difficult to see and fully comprehend that context. The Western knowledge system was, and, to a large extent, still is taken as the norm without questioning its normative qualities and functions. Since exclusivity was and still is very much part of a Western mindset (and still is strongly ingrained in my mind, even though I constantly try to reflect on it), the chance of being objective, especially in a South African context, remains minimal. The history that I construct is likely to be more biased because of historical circumstances.

The last characteristic of complex systems is that “each element in the system is ignorant of the behaviour of the system as a whole, and it responds only to information that is available to it locally” (Cilliers 2000:4). According to complexity theory, it is not possible for one element (one person) to fully comprehend the complexity of the entire system, but only to react and interact with local information. The focus is not on a single element but on the system as a whole. Systems such as the political, social, cultural and psychological were used as a lens in the case study investigation to see the broader context, but I, in fact, can only gain my understanding from the information available to me locally. Cilliers (2000:122) remarks that “because of the

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overwhelming amount of information available in postmodern society, we live under the illusion that we get the complete picture”.

THE IMPLICATIONS OF COMPLEXITY THEORY IN A CASE STUDY METHODOLOGY FOR IMPROVING CURRICULA

The content and the teaching and learning of a curriculum do not exist in a vacuum but are contained within a certain context. The content could also be regarded as a reduced version of the complexity that exists. The context in which the curriculum exists is made up of many complex systems such as political, economic, social or cultural. It is exactly in the context that the hidden curriculum (Apple 1979) positions itself. But Smith (2000) argues that in regarding curriculum as a contextualised social process, the concept of hidden curriculum becomes unnecessary. Representing the full complexity of the context is problematic and therefore it often remains hidden. When aiming at improving curricula, complexity theory as a lens could therefore be valuable.

The 10 characteristics described above give an idea of how data analysis for improving curricula could be approached differently. Haggis (2008:167-168) suggests four aspects of complexity theory that could be beneficial for the analysis of data in social research. Firstly, because interactions are interconnected and the relationship between factors produces effects, causality cannot be reduced to limited numbers of subthemes and themes. Secondly, the system as a whole (without reductions) should be studied or represented in terms of its interactions and compared with other systems. There are systems within systems and the borders of the case study (or curricula content) defined by the researcher exist within other systems. Thirdly, because of untraceable multiple interactions, unpredictability needs to be highlighted and incorporated when researching or constructing curricula. Fourthly, systems have coherence in the sense of identity, but because they are in constant flux over time, it is difficult to give the identity a boundary. Coherence, then, is not a structure that defines a system, but the processes that continue within the system itself.

When addressing real issues in society, it is important to understand that there are no simple, absolute answers to complex problems. Mendel-Reyes (1998:37) refers to Rhoads, who observes that there are few definite answers to the most pressing questions facing communities, and that negotiation or co-operation between institutions and communities becomes crucial when taking into consideration the complexities of issues. Postmodern society is complex. There is no reason why we could not acknowledge it as such, and aim to apply that knowledge to what we do and aim to understand. What complexity theory does is to explain the dilemma in which we find ourselves, the dilemma of being unable to fully represent reality. The case study methodology used to improve curricula is not complex because it is linear and it aims to define its own borders. What the case study aims to investigate is often very complex; such as a curriculum in context. That is why, according to Haggis (2008:162), the results of a case study are often very vague, because there is no clear answer to such complex

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questions. A complex situation would require a complex answer. Horn (2008:130) therefore argues for “coarse grained” methodologies to include more speculative interpretations to accommodate complexity.

When researching curricula, ethnographic approaches aim to operate from ‘within the system’ instead of ‘from above’. Cilliers (2000:123) encourages “entering into the agonistics of the network” to see from within to enable better understanding. Haggis (2008:172) suggests that researchers should be positioned within the “dynamic interacting system of multiple elements” where each individual participant in the research with an own internal subsystem is seen as an element of a system with a history through time (see example in Figure 16.3). Different types of connections and generalisations could then become possible. An example from Haggis (2008:172) suggests that, instead of a case study of an individual that is generalised to other people, the case study could be of one person during a certain time compared to the “history and evolution of factors within that person’s life”; instead of comparing curricula in different contexts, rather comparing different developments of a specific curriculum in different time frames.

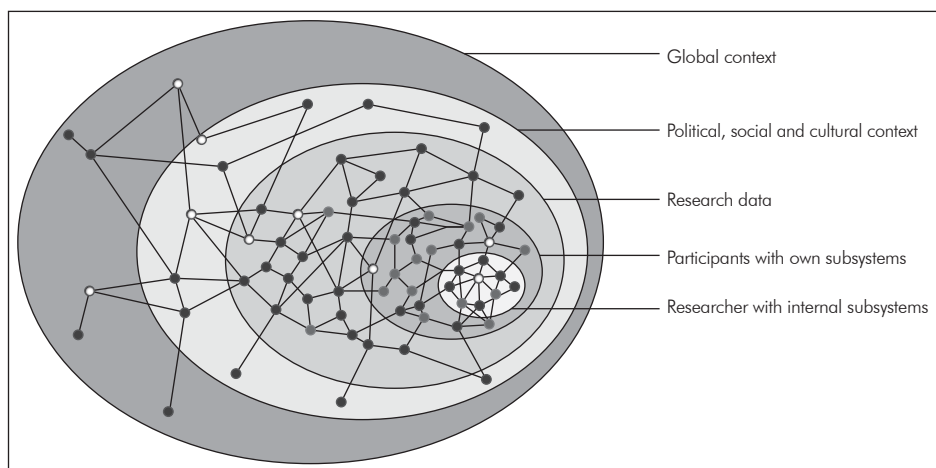


FIGURE 16.3 A representation of curriculum research with the researcher positioned within the context (adapted from Haggis 2008:171)

Not selecting a small number of important elements and grouping them together feels like a messy, confusing business; it is unorganised and unclear and resembles dwelling in the unknown. Realising and acknowledging the fact that the amount of elements involved in the research is too complex to comprehend, and being aware of the constant need to compartmentalise information is important, especially to the Western frame of mind. The process of “becoming to know” that Barnett (2008) discusses, relates to a space where we are constantly in a state of becoming and not

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in a place of knowing. Fenwick (2010) refers to Lather, who suggests “getting lost” and dwelling in the will not to know. Horn mentions Axelrod and Cohen (1999:45, cited in Horn 2008:139), who say that “harnessing complexity involves acting sensibly without fully knowing how the world works”. Fenwick (2010) also refers to information that should aim to be non-authoritative, relating to information that is not exclusively selected but includes even the seemingly unimportant parts, because one element or issue could have a huge effect on many other issues. Barnett (2000:409) argues that super-complexity could offer “completely new frames of understanding ... to help us comprehend and make sense of the resulting knowledge mayhem; and to enable us to live purposefully amid super-complexity”. He also suggests that, in an “age of super-complexity, a new epistemology for the university awaits, one that is open, bold, engaging, accessible, and conscious of its own insecurity. It is an epistemology for living amid uncertainty” (Barnett 2000:409).

After considering complexity in relation to case study methodology, one could ask where this leaves us. Seen from a research point of view, neither of the two systems, the case study or complexity theory, provides the answer. A case study tends to approach reality too simplistically; and complexity is too complex to use as a methodology. Barnett (2000:409) argues that “[k]nowledge, as a pure, objective reading of the world does have to be abandoned”. Cilliers (2010) subsequently suggests that a case study methodology should be used in an integrated way; conducting a case study but understanding that it is a partial view. Where does it leave us after having aimed to comprehend complexity? – according to Cilliers (2010), in a very modest space.

Implications for the Visual Communication Design curriculum

My suggestion for the Visual Communication Design curriculum would be to integrate complexity theory with research methodologies used in ventures such as the Citizenship module to understand the context of research into a curriculum more holistically. Complexity theory could be used to allow a broader perspective when analysing data in curriculum research and to widen one’s own view to find new ways of representing the world in a more realistic and not reductionist manner.

To enable better research, I also need to improve the epistemological way in which I view the world, and complexity theory could be a vehicle to achieve a more holistic view. ‘Holistic’ could refer to non-authoritative information (Fenwick 2010) and acknowledging the diversity of information without subjective selection. Transformation is needed in social realms as well as in the individual realm. This refers to changes in perceptions and attitudes required in people, not only policy changes in society. A critical examination of one’s own “overt and tacit political commitments, and one’s own embodied actions ... in all its complexities and contradictions” (Apple 2010:661) is required. The extent to which curriculum researchers in South Africa are able to think holistically is questionable, however; we ourselves are products of an unequal past and are all “carriers of troubled knowledge” (Jansen 2009:258).

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Nussbaum (2002) describes the ability to imagine oneself in a different situation as the “narrative imagination”. Pihlanto (1994:380) says that “not only actors but even researchers create their own world and interpret what they observe in empirical reality”. To construct a historical context that you have not experienced yourself needs some imagination, and to imagine a different world to the one that is known means opening up to other possibilities. Smolucha and Smolucha (1989:1) describe critical thinking as a “psychological system that involves the collaboration of several higher mental functions including memory, conceptual thought, analysis, synthesis, evaluation, and even *imagination*” [my emphasis].

Though we cannot construct a realistic picture of the world with case study methodology to improve the curriculum, we could aim to construct it better with the help of complexity theory. To construct a world different from the one that we know and experience, we need to think outside the confines of our normal box, and to enable that construct we could follow a creative process. Figure 16.1 presents the elements or factors involved in the case study. These factors are distributed randomly and all have equal weights because they all have the potential to influence each other to various degrees. “Small causes could have large results” (Cilliers 2000:4) and each element could also have an effect on itself. Each of these factors could connect and become a new or different perspective. In a typical creative process, many concepts are generated (the more concepts generated the better the chance of finding a good one), followed by connecting points randomly to force new meanings. Looking at the other side and finding what you are not looking for becomes an exploration of different perspectives.

Figure 16.1 presents an example of a creative process involving random connecting points and forcing new meanings. It relates to the rhizome concept of Deleuze and Guattari (1988), which proposes theory and research that allow for many, non-hierarchical entry and exit points in data interpretation. The rhizome concept opposes totalising principles that work with dualist groupings and binary oppositions. In these rhizomes, everything can be linked to something else, also linking things that have nothing to do with one another. Eco (1984) refers to a labyrinth or net-like structure of meaning that is interconnected, open in every direction and exposed to continuous modification over time. Wittgenstein (1958) prefers the rhizome model of thinking and uses a similar concept that he calls “family resemblance” to demonstrate that concepts that seem to be connected by one common feature may also be connected to multiple sequences of similarities.

As an alternative to a reductionist case study approach, a new data analysis was followed by which all the factors identified in the data (Figure 16.1) were used in the analysis of the Citizenship module. It remained a reduction, but including all the factors allowed more variations in understanding and resulted in broader interpretations of the data. In this approach all the factors were investigated and meanings started to emerge when factors were connected and the relationships between factors explored.

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The interconnected analysis and interpretations of the data, when written up, contained various short narratives in which multiple results with their conclusions were formulated. This relates to Barnett's conception that "... [w]hat counts as truth and knowledge are open, as knowledges multiply and as frameworks for comprehending the world proliferate. In the end, all we have is proliferating stories of the world" (2000:420).

CONCLUSION

This chapter has described the process that was followed after I realised that a case study methodology for analysing complex data in a Citizenship module aimed at changing perceptions and attitudes for social transformation was insufficient. I then explored alternative means of analysis. In a complex environment, I believe, complexity theory could be an important lens to assist in analysis for curriculum inquiry. The purpose of the investigation was not to replace the case study methodology, but to see how it could be combined with complexity theory. Complexity theory offers viewpoints that enhance the possibility of representing a complex reality.

Case study methodology reduces information to chosen themes and subthemes, and, in so doing, misses the relationships between factors. Such data reduction was found to be limiting in curriculum research and development. Focusing on relationships between factors means that the effect of the interactions is more important than the reasons for interaction. However, it is practically impossible to describe the relationships between all factors identified in the research. In our investigation we could compromise by using a methodology such as the case study by which information is reduced, in the full knowledge that it is partial and unable to represent real complexity. If one tries to represent the complexity in a case study, one often achieves vague outcomes. To allow for the impossibility of capturing and describing reality accurately, research should allow more space for broader interpretations and narrative constructions. An alternative data analysis process that includes many factors (as in Figure 16.1) that represent the world in a more realistic and holistic manner is suggested. Seeking the relationships between factors could help us find multiple and possibly more accurate solutions to problems.

The specific implication for the Visual Communication Design curriculum is that complexity theory could be incorporated into research projects. On a more general level it could enhance the self-reflection of students and lecturers in the teaching and learning environment. The creativity and imagination that have already developed in a visual communication design course could be further explored and incorporated in research projects to develop the ability to imagine oneself in the shoes of others, and imagine worlds that are not known or have not been experienced. Imagination can be used fruitfully when forcing connections between random factors in a complex system to create new meanings that have the potential to enhance curriculum research and curricula.

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